

Research Paper: Effectiveness of Meta-Cognitive Skills Training on Self-Handicapping and Self-Efficacy of Students



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ABSTRACT

Objectives: Considering the negative effect of self-handicapping on both mental and physical health and the positive effect of self-efficacy on success and efficacy of people, this research has been conducted with the aim of investigating the effect of meta-cognitive skills training on self-handicapping and self-efficacy of students.

Methods: This research is an experimental study with pre/post-test, and 28 student participants were allocated to experimental and control groups randomly (14 persons per group). Jones and Rhodewalt Self-Handicapping Scale, Sherer and Maddux Self-Efficacy Scale, and Raven Standard Progressive Matrices Test had been utilized for data collecting. The meta-cognitive training program was provided to the experimental group within two months in six sessions while students of the control group did not receive any training.

Results: Covariance analysis proposes that meta-cognitive training has a significant effect on decreasing self-handicapping in experimental group; however, there are no significant differences in the results of self-efficacy post-test in both experimental and control groups.

Discussion: Findings of the present study suggest that meta-cognitive skills training- as an effective training program- could be used for decreasing students' self-handicapping. But with regards to the effectiveness of meta-cognitive skills training on self-efficacy, it is revealed that more variables are involved, and it needs further investigation.

1. Introduction

Meta-cognition is an aspect of cognitive processing that is responsible for planning, evaluating, analyzing, and monitoring cognitive content [1, 2]. It determines individuals' views on cognitive tasks, particularly the challenging ones [3, 4].

Meta-cognition configures our evaluations and affect in strategies using for controlling our emotion and thought [1, 4, 5]. It leads to increase in speed and strength of cognition and helps learners to be aware of their cognitive system. This can further help the learners to find ways for overcoming learning obstacles, prepare necessary facilities for optimal learning, and conduct all their activities during all processes of thinking [6]. Furthermore,

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meta-cognition leads to strengthen students' responsibility for learning in their learning goals [7]. Meanwhile, some people resort to some self-defeating behavior such as self-handicapping strategies to escape from probable future failure and justify it. This strategy is a less familiar strategy presented by Bergelas and Jones in 1978. They defined self-handicapping as obstacles creating or claiming by individuals in anticipation of a failing performance. In the event of a possible failure, it would be irrelevant to their merits. In fact, this strategy is used to manipulate beliefs of the others [8-10], and it prepares a justifiable excuse to lean on it. Therefore, self-handicapping is a weakening feature of performance [11-14].

In an academic situation, self-handicapping is demonstrated in different forms such as alcohol and drug abuse, procrastination and failure to complete assignments, lack of studying lessons, lack of attention in the classroom and non-preparation for exams [12, 15-19], positive attitude toward cheating and acting it [20]. In contrast, self-efficacy is the opposite of self-handicapping and refers to individuals' beliefs about their own capabilities to do a certain level of performance. It is the sense of competence, efficiency, and ability to deal with life and individuals' perception of their skills in life [21]. Bandura considered this belief as a determinant of attitude, behavior, and feeling. Therefore, self-efficacy is a concept that facilitates the merging of one's experiences, abilities and thinking in one way [22-25]. It plays the role of a cognitive mediator and an observer of beliefs for performing special activities and assignments. Consequently, self-efficacy influenced not only by ones' abilities but also affects ones' abilities and their success [26].

Relation among meta-cognition, self-handicapping & self-efficacy

Different studies have indicated that self-handicapping and self-efficacy have a negative correlation [12, 27, 28]. In other words, individuals who are more self-handicapper have fewer self-efficacy beliefs. Therefore, it is possible that self-handicapping reducing factors lead to improved self-efficacy and vice versa. In addition, research literature in the field of meta-cognition and self-efficacy suggested a positive relation between these two variables [29-32]. However, studies about self-handicapping and meta-cognitive skills are limited to the correlational domain, and there is no experimental research on these two variables. Available researches about these variables suggest a positive relationship between them [33, 34].

The present study

Considering the importance of self-handicapping and self-efficacy views toward goals, tasks, and life challenges, identifying self-handicappers and those with low self-efficacy, and training them to improve could be effective for those involved in the education, treatment, and management of behaviors affected by self-handicapping and self-efficacy. Meanwhile, cognition and self-evaluation play a determinant role and affect the individuals' perceptions regarding situations and measurements [35]. It is expected that training based on cognition are effective on these two variables. Despite different studies confirming the correlation between meta-cognitive, self-handicapping, and self-efficacy, the effectiveness of meta-cognitive skills training has not been significantly addressed. Therefore, the present study aimed to investigate the effect of meta-cognitive skills training on self-handicapping and self-efficacy of students. In this study, it is hypothesized that (H1) "Training on meta-cognitive skills reduces students' self-handicapping" and (H2) "Training on meta-cognitive skills increases students' self-efficacy."

2. Methods

This research was an experimental study with pre/post-test in two groups (experimental and control groups) with the purpose of investigating the effect of meta-cognitive skills training on self-handicapping and self-efficacy of students.

Participants

In this study, 28 students were selected from different high schools in Rasht, Iran. Then these participants were randomly assigned into two experimental and control groups (14 students per group) based on inclusion and exclusion criteria mentioned in the subsequent subsections.

Inclusion criteria

Female students in 7th grade with normal intelligence quotient (IQ=85~115) having the highest scores in self-handicapping scale and the lowest scores in self-efficacy scale were included in the study.

Exclusion criteria

Students with any mental or physical disease and absent in more than 1 session of the training program were excluded from the study.

Procedure

After running pre-test and evaluating intelligence quotient, 28 students were selected based on the inclusion and exclusion criteria. For investigating the students' health status, their health files were reviewed. Then they were randomly assigned into two experimental and control groups. The mean age of the participants in the experimental group (N=14) was 12.07 years (SD=0.27), and their mean IQ was 106 (SD=5.59). In the control group, the participants' (N=14) mean age was also 12.07 years (SD=0.27), and their mean IQ was 104.79 (SD=9.87).

The participants in the experimental group underwent meta-cognitive training programs held in six sessions (one session per week) within two months while the control group did not receive any training. After the training period, the self-handicapping and self-efficacy views of all the participants were reassessed. The processes of conducting tests as well as training were done in a group.

Materials

Self-Handicapping Scale

In this study, self-handicapping was measured using Jones and Rhodewalt Self Handicapping Scale (1982). The original version of this scale consists 25 self-report items for measuring the individuals' tendency for applying strategies such as lack of effort, malingering, procrastination, emotional distress, and anxiety about the progress. The ratings are based on a 6-point Likert scale ranging from 5 (strongly agree) to 0 (strongly disagree). Higher scores are associated with greater self-handicapping. The normalized version of this scale is reduced to 23 items by Heidari & et al in 2009 [36]. The reliability of the test factors was obtained to be between 0.38 and 0.70 from Cronbach's alpha by Kathleen and Lawrence (1999) [37] and between 0.60 and 0.72 by Heydari & et al in 2009 [36]. In addition, the reliability of the whole scale has been reported to be 0.69 [38], 0.77 [36], and 0.91 [39] by Cronbach's alpha.

Self-Efficacy Scales

The Sherer and Maddux Self-Efficacy Scale was used to evaluate the self-efficacy of the students. This scale consists of 17 items and can be run for all age domains. Without specifying the items, Sherer and Maddux believed that this scale can measure three aspects of behavior including "Willingness to initiate behavior," "Willingness to expand the effort in completing the behavior,"

and "Persistence in the face of adversity" [40]. The ratings are based on 5-point Likert scale ranging from strongly disagree to strongly agree (1 to 5) for items 1, 3, 8, 9, 13, and 15. For the other items, the scoring is vice versa (5 to 1). Indeed, the highest total score that represents higher self-efficacy would be 85, and the lowest total score that represents lower self-efficacy would be 17. This scale has been translated and normalized by Barati Bakhtiyari (1997) [41]. The reliability of this scale in the Iranian population is reported to be 0.83 [41] and 0.80 [42] by Cronbach's Alpha.

Raven Standard Progressive Matrices Test

In this study, for evaluating the students' general IQ, Raven's Progressive Matrix Test (1943), which is known as the best indicator for measuring general intelligence, was used. This test consisting of 60 items was constructed by Raven for the age group of 9 to 18 years and could be taken both individually or in group. This test has been normalized for Iranian students in 1977 by Barahini, and the range of its validity is between 0.24 and 0.61. Also its correlation with Wechsler IQ test is 0.73.

The 60 items of the test consist of matrices that have one part removed from each of them. The participant is required to find the removed item among 6 or 8 different options. Studies have showed that the matrices have the necessary technical and psychometric requirements. The conducted researches in Iran on the Raven test indicate its reliability with the cultural environment of Iran [43]. The reliability of this test was obtained through re-test (0.91), and analysis of the test items was 0.83, which was evaluated by examining the internal consistency of the items through Cronbach's alpha coefficient [44].

Meta-cognition skills training program

The training program in this study included training on the cognition and meta-cognition skills. The training package was based on Saif (2010), and it was prepared and presented by the researcher with the advice of experts of educational psychology. For optimal use of time, training materials were in a Power Point file that was presented to the students by the researcher. For slide preparation, attractive images and colors relevant to each topic were used to create visual and perceptual appeal for students. To make the content tangible, examples extracted from students textbooks were also used in the sessions. In each session, there were questions and answers about the subject of the training as well as answering the students' questions. The training syllabus is presented in Table 1.

Table 1. Training Syllabus

Session	Training Syllabus
Session 1	Rehearsal strategy
Session 2	Elaboration strategy
Session 3	Organization strategy
Session 4	Planning strategy
Session 5	Monitoring strategy
Session 6	Regulating strategy

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Data analysis method

Descriptive method of mean and standard deviation was used to reveal the descriptive indicators of the variables. In inferential data analysis, one-way covariance analysis test (ANCOVA) through SPSS software was utilized to neutralize the statistics effect of IQ and pre-test scores and analyze the collected data and examine the hypothesis in this study.

3. Results

The descriptive indicators for the main variables in this study are shown in Table 2. Both the main variables (self-handicapping and self-efficacy) had a significant improvement in post-test in the experimental group, but this change does not seem much significant in the control group.

Table 3 reports the result of ANCOVA differential analysis of self-handicapping, self-efficacy and IQ in experimental and control groups. According to data in Table 3, self-handicapping post-test score ($F=4.24, P>0.05$) is significant. It means there is a difference between experimental and control groups in post-test scores for self-

handicapping. Eta number ($\eta=0.15$) also confirmed that this difference is high and considerable¹. While the IQ score ($F=0.72, P>0.05$) has no significant effect on the post-test score, the pre-test ($F=4.28, P>0.05$) shows that it does not have a significant effect on post-test scores.

The self-efficacy post-test score ($F=1.75, P>0.05$) was found to be not significant. It means there is no significant difference between experimental and control groups in post-test scores. The F scores referring to IQ ($F=0.04, P>0.05$) has also no significant effect on the post-test score.

Table 4 presents the estimated means of self-handicapping and self-efficacy scores in groups. It shows the mean of self-handicapping in the experimental group is 76.10, and in the control group is 80.90. The mean difference between these two groups is 4.80, which is significant at $P<0.05$. Therefore, it can be concluded that the mean score of the experimental group is significantly less than that of the control group. Regarding self-efficacy, the mean difference between experimental and control groups ($MD=3.32$) is not significant ($P<0.05$). It means that there is no significant difference between the two groups.

1. Defining level of eta number; $\eta=0.005$ as low, $\eta=0.04$ as medium, $\eta=0.1$ as high [45]

Table 2. Descriptive indicators for main variables

Group	Scale	Pre-Test		Post-Test	
		Mean	SD	Mean	SD
Experimental	Self-handicapping	76.50	7.44	75.50	7.26
	Self-efficacy	58.57	5.57	62.64	7.54
Control	Self-handicapping	79.14	4.62	81.50	5.44
	Self-efficacy	53.29	5.24	54	5.99

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Table 3. One-way covariance analysis of differential in experimental & control group

Variable	Source	SS	df	MS	F	sig.	η
Self-handicapping	IQ	26.12	1	26.12	0.72	0.403	0.09
	Pre test	154.31	1	154.31	4.28	0.050	0.151
	G. Me.	153.16	1	153.16	4.24	0.050	0.150
	Error	866.23	24	36.09			
Self-efficacy	IQ	1.75	1	1.75	0.04	0.845	0.002
	Pre test	76.58	1	76.58	1.72	0.202	0.064
	G.Me.	1116.03	25	44.64			
	Error	1.75	1	1.75	0.04	0.845	0.002

G. Me.=Group Membership, η =Eta coefficient

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4. Discussion

This study has been conducted with the aim of investigating the effect of meta-cognitive skills training on self-handicapping and self-efficacy of students regarding controlling their intelligence quotient. The results of this study indicate that meta-cognitive skills training was effective in decreasing self-handicapping, but it did not have any significant effect on self-efficacy improvement. Regarding the first hypothesis, the result of this research is consistent with Kleitmann and Gibson (2011) in respect of negative correlation between meta-cognitive skills and self-handicapping [33].

Meta-cognitive skills in individuals are responsible for controlling human cognitive system. "It related to volition, which has to do with action control and strategy use. The deliberate specification of meta-cognitive skills entails that the person consciously and purposively applies strategies" [45]. It helps the person to be aware

and confident that his/her thinking is in parallel with his/her desired goals. With a sense of supervision and regulation, the meta-cognitive skills training can help enhance self-esteem and self-concept [46], and it leads to an improvement in self-handicapping. Also, those who have meta-cognitive skills will notify to the relationship between the realities of the problems and analyze their decision, analyze complex issues to more detailed steps, and control route and direction of their thinking by asking themselves [3]. Deficit in problem solving is one of the foibles of self-handicappers that can be improved through training of meta-cognitive skills.

Hoskin (2000) also believes that the concept of meta-cognition is associated with information processing learning theories [47]. In his view, as computers retrieve and use input through codes and algorithm, human's cognition retrieves and analyzes information through algorithm and loops. In his view, meta-cognition increase cognitive structure and its complexity and algorithm

Table 4. Self-handicapping and self-efficacy final estimated mean in groups

Variable	Group	M	MD	SD	sig.
Self-handicapping	Experimental	76.10	-4.80	2.23	0.05
	Control	80.90	4.80	2.23	0.05
Self-efficacy	Experimental	4.05	3.32	2.53	0.202
	Control	0.73	-3.32	2.53	0.202

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abilities. It leads to increased solving problem capacity and goal achieving. Regarding the second hypothesis, the findings of this research are contrary to that of some of the previous studies [29, 30, 44, 48]. Although the previous studies reported that meta-cognitive skills training increase self-efficacy in learners by changing the way of thinking, the results of this study did not show any meaningful correlation between post-test scores of both experimental and control groups. It seems that more variables are involved.

One of the main sources of self-efficacy is mastery experiences [21]; therefore, short training period and its evaluation might be a reason for the lack of effectiveness of this training on self-efficacy. In other words, some more time is needed for students to modify their cognition about themselves and pay attention to their previous experiences as mastery ones. Another possibility for lack of training effectiveness on self-efficacy is the use of the self-report material. As the participants' age range was from 12 to 13 years, it is likely that they did not have enough self-awareness or did not answer to the scale items responsibly and accurately. Therefore, if more accurate measurement tools are utilized or clinical interviews are used to estimate the level of self-efficacy, more accurate information in this field may be extrapolated. On the other hand, it is possible that there were other hidden factors such as student backgrounds, negative experiences, and parenting styles that prevented the effectiveness of meta-cognitive skills training on self-efficacy of students.

This research was conducted with some limitations. Considering the scaling materials that were self-reporting and the participants' age range, it might be possible that participants did not have enough self-awareness or enough responsibility to answer items accurately. As well, due to the lack of possibility of access to the participants, following the results was not possible. Furthermore, the training was done by the researcher; hence, it might lead to prejudice in the result.

Based on the findings of this study, the following suggestions have been offered: 1. Further study should focus on scaling materials for evaluating self-efficacy and self-handicapping that are not based on self-report; 2. The patients should be further followed up patients to check for the robustness of the result; 3. Care should be taken to ensure that the researcher and the experimenter were not the same person to avoid probable prejudice in the result; and 4. Due to the lack of experimental researches concerning different intervention programs for the main variables of this study, especially for self-handicapping,

it is recommended to conduct researches experimentally more in this field.

5. Conclusion

Considering the negative effect of self-handicapping on both mental and physical health and the positive effect of self-efficacy on success and efficacy of people, and the mediator act of cognition in both self-handicapping and self-efficacy, the results of this research showed that meta-cognitive skills training is an effective training program. This training could be used for decreasing students' self-handicapping. With regards to the effectiveness of meta-cognitive skills training on self-efficacy, it seems that more variables are involved and it needs further investigation.

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Conflict of Interest

The authors declared no conflicts of interest.

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